

APPENDIX L

SURFACE WATER QUALITY IMPACTS

The information in this appendix was generated for the SDEIS and can be compared to the alternatives maps in the FEIS (Figure 2-4 and 2-5). The Preferred Line for the FEIS corresponds to line 5 and the preferred segments in the tables below.

Potential surface water quality impacts were compared between the alternatives using a method developed by AHTD. A system was devised to calculate a stream crossing Water Quality Index (WQI) Rating. Two parameters were determined for each area of stream impact. Each parameter received a relative rating based on the perception of increasing impacts.

The first parameter used USGS Quadrangle maps to determine if the stream had intermittent or perennial flow. Intermittent streams received a Flow Rating = 1, and perennial streams received a Flow Rating = 2.

The second parameter concerned the length of the stream that would potentially be impacted by the project, as well as the amount and type of construction that could be taking place in the stream locality. A stream which had a perpendicular crossing by the main lanes received an Impact Area Rating = 1. A stream which had a linear impact by the main lanes received an Impact Area Rating = 2. Streams which would be impacted by the main lanes and/or ramps in an interchange area received an Impact Area Rating = 3.

After a determination of these parameters, the following equation was used to determine the WQI Rating

$$\text{Flow Rating} \times \text{Impact Area Rating} = \text{WQI Rating}$$

Each stream crossing was placed in one of three potential impact categories based on the individual WQI rating.

Impact categories were based on the distribution of WQI scores calculated for the individual stream crossings. Scores above 4 correspond to the high potential impact category, scores less than or equal to 2 correspond to the low potential impact categories, and scores from 3-4 were considered to be a medium impact category.

Table L-1 shows a break down of the stream types and impact areas of each stream by alignment and segment. Tables L-2 through L-6 illustrates the Stream WQI Ratings by alignment and segment. Table L-7 lists the totals for each Impact Category of Stream WQI

Ratings by alignment and segment. Table L-8 lists the totals for each Impact Category of Stream WQI Ratings by alignment.

Table L-1 Stream Name, Type and Impacts								
No.	Stream Name	Stream Type	Impact Area	Line 2	Line 3	Line 4	Line 5	Preferred Segment
1	Unnamed tributary of Wildcat Creek	intermittent	interchange main lanes & ramps					AB
2	Unnamed tributary of Brush Creek	intermittent	perpendicular/main lanes					AB
3	Unnamed tributary of Brush Creek	perennial	perpendicular/main lanes					AB
4	Unnamed tributary of Brush Creek	intermittent	perpendicular/main lanes					AB
5	Unnamed tributary of Brush Creek	intermittent	perpendicular/main lanes					AB
6	Unnamed tributary of Brush Creek	intermittent	perpendicular/main lanes					AB
7	Brush Creek	perennial	perpendicular/main lanes					AB
8	Unnamed tributary of Spring Creek	intermittent	interchange main lanes & ramps					AB
9	Unnamed tributary of Brush Creek	perennial	perpendicular/main lanes					AB
10	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	BC		BC		
11	Spring Creek	perennial	perpendicular/main lanes		BC			
12	Puppy Creek	intermittent	interchange main lanes & ramps		BC		BC	
13	Spring Creek	perennial	interchange main lanes & ramps	BC		BC		
14	Unnamed tributary of Spring Creek	intermittent	interchange main lanes & ramps	BC		BC		
15	Unnamed tributary of Spring Creek	intermittent	interchange ramps	BC		BC		
16	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	BC		BC		
17	Unnamed tributary of Spring Creek	intermittent	interchange main lanes & ramps	BC		BC		
18	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	BC		BC		
19	Unnamed tributary of Puppy Creek	intermittent	interchange ramps	BC		BC		
20	Puppy Creek	intermittent	perpendicular/main lanes	BC		BC		
21	Unnamed tributary of Puppy Creek	intermittent	interchange ramps		BC			
22	Unnamed tributary of Spring Creek	intermittent	interchange main lanes & ramps		BC			
23	Spring Creek	perennial	interchange main lanes & ramps		BC			
24	Spring Creek	perennial	perpendicular/main lanes				BC	
25	Unnamed tributary of Puppy Creek	intermittent	linear/main lanes				BC	
26	Puppy Creek	intermittent	linear/main lanes				BC	
27	Unnamed tributary of Puppy Creek	intermittent	perpendicular/main lanes				BC	
28	Unnamed tributary of Spring Creek	intermittent	linear/main lanes	BC		BC		
29	Unnamed tributary of Puppy Creek	intermittent	perpendicular/main lanes				BC	

**Table L-1, Continued
Stream Name, Type and Impacts**

No.	Stream Name	Stream Type	Impact Area	Line 2	Line 3	Line 4	Line 5	Preferred Segment
30	Unnamed tributary of Spring Creek	intermittent	linear/main lanes			CD		
31	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	CD				
32	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	CD				
33	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes		CD			
34	Unnamed tributary of Spring Creek	intermittent	perpendicular/main lanes	CD				
35	Unnamed tributary of Spring Creek	intermittent	interchange main lanes & ramps	DE				
36	Unnamed tributary of Friendship Creek	intermittent	linear/main lanes	DE				
37	Unnamed tributary of Friendship Creek	intermittent	linear/main lanes		DE			
38	Unnamed tributary of Friendship Creek	intermittent	linear/main lanes	DE				
39	Unnamed tributary of Phillips Creek	intermittent	interchange main lanes & ramps		DE	DE		
40	Unnamed tributary of Friendship Creek	intermittent	perpendicular/main lanes					EF
41	Unnamed tributary of Friendship Creek	intermittent	perpendicular/main lanes					EF
42	Unnamed tributary of Friendship Creek	intermittent	perpendicular/main lanes					EF
43	Unnamed tributary of Friendship Creek	intermittent	perpendicular/main lanes					EF
44	Friendship Creek	intermittent	perpendicular/main lanes					EF
45	Unnamed tributary of Friendship Creek	intermittent	interchange ramps					EF

**Table L-2
Line 2 Stream WQI Ratings by Segment**

Segment	Stream Name	Stream Type	Flow Rating	Impact Area	Impact Area Rating	WQI Rating	Impact Category
BC	Spring Creek	perennial	2	interchange main lanes & ramps	3	6	High
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	linear/main lanes	2	2	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Puppy Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Puppy Creek	intermittent	1	interchange ramps	3	3	Medium
CD	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
CD	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
CD	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
DE	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
DE	Unnamed tributary of Friendship Creek	intermittent	1	linear/main lanes	2	2	Low
DE	Unnamed tributary of Friendship Creek	intermittent	1	linear/main lanes	2	2	Low

**Table L-3
Line 3 Stream WQI Ratings by Segment**

Segment	Stream Name	Stream Type	Flow Rating	Impact Area	Impact Area Rating	WQI Rating	Impact Category
BC	Spring Creek	perennial	2	perpendicular/main lanes	1	2	Low
BC	Puppy Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Spring Creek	perennial	2	interchange main lanes & ramps	3	6	High
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Puppy Creek	intermittent	1	interchange ramps	3	3	Medium
CD	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
DE	Unnamed tributary of Phillips Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
DE	Unnamed tributary of Friendship Creek	intermittent	1	linear/main lanes	2	2	Low

Segment	Stream Name	Stream Type	Flow Rating	Impact Area	Impact Area Rating	WQI Rating	Impact Category
BC	Spring Creek	perennial	2	interchange main lanes & ramps	3	6	High
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Spring Creek	intermittent	1	linear/main lanes	2	2	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Spring Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Puppy Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Puppy Creek	intermittent	1	interchange ramps	3	3	Medium
CD	Unnamed tributary of Spring Creek	intermittent	1	linear/main lanes	2	2	Low
DE	Unnamed tributary of Phillips Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium

Segment	Stream Name	Stream Type	Flow Rating	Impact Area	Impact Area Rating	WQI Rating	Impact Category
BC	Spring Creek	perennial	2	perpendicular/main lanes	1	2	Low
BC	Puppy Creek	intermittent	1	linear/main lanes	2	2	Low
BC	Puppy Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
BC	Unnamed tributary of Puppy Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Puppy Creek	intermittent	1	perpendicular/main lanes	1	1	Low
BC	Unnamed tributary of Puppy Creek	intermittent	1	perpendicular/main lanes	1	1	Low

**Table L-6
Preferred Segment Stream WQI Ratings**

Segment	Stream Name	Stream Type	Flow Rating	Impact Area	Impact Area Rating	WQI Rating	Impact Category
AB	Unnamed tributary of Wildcat Creek	intermittent	1	interchange main lanes	3	3	Medium
AB	Unnamed tributary of Brush Creek	intermittent	1	perpendicular/main lanes	1	1	Low
AB	Unnamed tributary of Brush Creek	perennial	2	perpendicular/main lanes	1	2	Low
AB	Unnamed tributary of Brush Creek	intermittent	1	perpendicular/main lanes	1	1	Low
AB	Unnamed tributary of Brush Creek	perennial	2	perpendicular/main lanes	1	2	Low
AB	Unnamed tributary of Brush Creek	intermittent	1	perpendicular/main lanes	1	1	Low
AB	Unnamed tributary of Brush Creek	intermittent	1	perpendicular/main lanes	1	1	Low
AB	Brush Creek	perennial	2	perpendicular/main lanes	1	2	Low
AB	Unnamed tributary of Spring Creek	intermittent	1	interchange main lanes & ramps	3	3	Medium
EF	Unnamed tributary of Friendship Creek	intermittent	1	interchange ramps	3	3	Medium
EF	Unnamed tributary of Friendship Creek	intermittent	1	perpendicular/main lanes	1	1	Low
EF	Unnamed tributary of Friendship Creek	intermittent	1	perpendicular/main lanes	1	1	Low
EF	Unnamed tributary of Friendship Creek	intermittent	1	perpendicular/main lanes	1	1	Low
EF	Unnamed tributary of Friendship Creek	intermittent	1	perpendicular/main lanes	1	1	Low
EF	Friendship Creek	intermittent	1	perpendicular/main lanes	1	1	Low

Table L-7				
Impact Category Totals by Segment and Alignment				
Segment	Alignment	Low WQI	Medium WQI	High WQI
A-B	Preferred Segment	7	2	0
B-C	Line 2	5	4	1
	Line 3	1	3	1
	Line 4	5	4	1
	Line 5	5	1	0
C-D	Line 2	3	0	0
	Line 3	1	0	0
	Line 4	1	0	0
	Line 5	0	0	0
D-E	Line 2	2	1	0
	Line 3	1	1	0
	Line 4	0	1	0
	Line 5	0	0	0
E-F	Preferred Segment	5	1	0

Table L-8			
Impact Category Totals by Alignment			
Alignment	Low WQI	Medium WQI	High WQI
No-Action	0	0	0
Line 2	10	5	1
Line 3	3	4	1
Line 4	6	5	1
Line 5	5	1	0

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